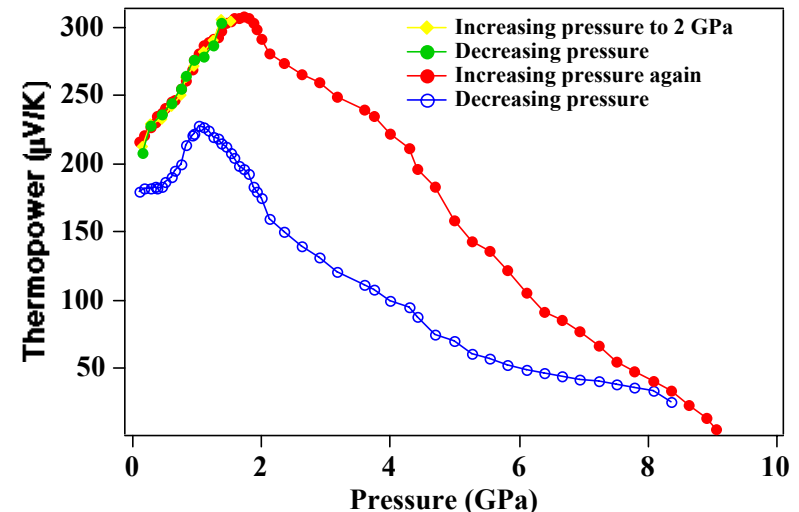


Pressure Tuning of Advanced Thermoelectric Materials

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Collaborators: Francis J. DiSalvo (Cornell), Gerald D. Mahan (Penn State)

- Thermoelectric materials: solid state refrigeration
- Have shown thermoelectric efficiency, ZT, can be considerably enhanced by pressure tuning. “Proof of principle” finding.
- Developed density functional (WIEN97) computer code to predict and understand thermoelectric power vs pressure
- Insight from calculations will help in designing new materials to reproduce improved results at ambient pressure
- Experiments to reproduce high pressure results at ambient pressure are underway



Thermoelectric Power vs. Pressure for antimony bismuth telluride

Broader Aspects

- Industrial collaboration with Guardian Industries to characterize carbon films on glass by means of deep UV (257 nm) Raman spectroscopy. UV Raman spectrometer funded by NSF, “High Pressure Synthesis of Covalently Bonded Networks”
- On sabbatical leave 2001-2002 at University of Southampton (UK), Optoelectronics Research Center
 - Collaboration to characterize surfaces of optoelectronic materials by means of UV Raman
 - Will continue various collaborations through Penn State/University of Southampton Worldwide University Network